

## Oral Dryness in Post Menopausal Women: Hormonal Impact

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### Abstract

Menopause is the physiological process of cessation of normal menstruation occurring in the fifth decade of life in women. This leads to certain hormonal variations which results in few clinical systemic manifestations along with oral symptoms. The main oral symptoms include oral dryness, mucosal lesions such as lichen planus, benign pemphigoid, Sjogren syndrome and burning mouth syndrome with increased incidence of periodontal disease.

The clinical examination of postmenopausal problems on dental examination reveals decreased salivation, dental caries, reduce taste sensation, atrophic gingivitis, periodontitis and rarely include osteoporosis of jaw. Oral physicians who treat postmenopausal women needs to understand the stressful phase of life their patients are experiencing. Oral physician should keep the arena open for consultation with gynecologist and general physicians for evaluating the use of HRT for the benefit of the patient.

**Keywords:** Menopause; Oral dryness; Estrogen; Saliva

### Introduction

The oral cavity has been known the mirror image to the body because many oral changes appear in the oral cavity before the generalized manifestations of the systemic diseases. Oral changes also include the ageing physiological process of life [1]. Oral health is not just limited to the healthy teeth but also includes healthy mucosa, periodontium, undetermined functioning like salivation, taste sensation and also the subsequent impact on systemic changes.

Oral dryness and burning mouth is the enigmatic problem in geriatric population. This has been posing the challenge for the oral physicians, because on clinical examination the mucosa is normal and no pathologic lesions are evident. This annoying subjective sensation is unrelated to the reduced salivation in nearly one third of xerostomic patients [2]. In a woman's life during fifth decade the levels of sexual hormone like follicular stimulating hormone (FSH) and luteinizing hormone (LH) no longer perform their functions to regulate the estrogen, progesterone and testosterone levels. These inevitable changes in the hormones level during the menopause results in some clinical manifestation which have major impact on the quality of the life. In addition, the lower level of oestrogen along with age changes results in increased risk of developing cardiovascular problems, osteoporosis, Alzheimer's disease and oral diseases in women [3-6].

Decrease of estrogen in post-menopausal women results in oral conditions such as oral dryness and burning mouth syndrome. Other less common symptoms associated with menopause are altered taste sensation, thick salivation and certain oral mucosal lesions such as benign mucosal pemphigoid, lichen planus, and Sjogren's syndrome [7]. Atrophic senile gingivitis which is an abnormal paleness of the

gingival tissues and loss of alveolar bone height due to menopausal induced osteoporosis has also been reported.

The paucity of saliva has been implicated as a cause of increased dental caries, and may be responsible for the increased prevalence of oral dysesthesia and taste alterations. The increased incidence of oral symptoms has been reported greater in menopausal women (43%) as compared to premenopausal females (6%) [3]. Increased oral discomfort in postmenopausal women has also been reported by Ferguson et al. and Wardrop et al. [8]. Oral dryness has been increasingly seen in menopausal women who are undergoing medication for systemic diseases as well as in post-menopausal women without any systemic disease or those who are not undergoing any medicinal therapy. This reported oral dryness is unrelated to lowered salivary flow rates [9,10].

Oral dryness has a significant impact on the patient quality of life and also has the potential for oral complications, so it is important for oral physician to differentiate between patients where oral dryness is subjective sensation or due to salivary hypo-functioning. This will help in managing these patients appropriately.

### Impact of Hormones on Saliva

Saliva, a complex and versatile body fluid, is critical for oral function as it is responsible for lubricating and protecting all surfaces in the oral cavity. The composition of female saliva varies during different hormonal stages, such as during menstrual period, pregnancy and at menopause. [11,12]. The age of the patient at the onset of oral dryness is mostly around 50-60 years, with a marked predominance in female (3:1). The incidence of oral dryness increases more in women with advancement of age suggesting that hormonal changes after menopause plays an important role [8].

Various studies have concluded that salivary changes have been associated with hormonal changes mainly with the estrogen [9,13,14]. Virtanen et al. reported that the concentration of calcium was lower in saliva during ovulation period whereas estrogen level was at high level and appeared to be lower in labor than during the pregnancy [15]. Mojabi concluded that reduced salivary flow rate and a high prevalence of oral symptoms in menopausal women were seen in postmenopausal women which may be related to the hormonal alterations [7].

Agha et al. and Singh et al. proved that in oral dryness postmenopausal women salivary calcium concentration was significantly higher [9,13]. Sewon et al. earlier suggested that salivary calcium was high in post-menopausal women and there was subsequent decrease in calcium concentration in stimulated saliva on initiation of hormonal replacement therapy [16]. This increased calcium may be due to increased cortisol salivary concentration which was significantly more in postmenopausal women with oral dryness [17]. This excess level of cortisol leads to decreased absorption of calcium in intestine and inhibition of renal calcium re-absorption [18].

Agha et al. reported significant rise in salivary PTH levels in postmenopausal women patients oral dryness [19]. However Singh et al. concluded that although patients with oral dryness had increased levels but not statistically significant [20]. The possible mechanism behind the rise in PTH level is that the lower level of estrogen in postmenopausal women influences the absorption of calcium in intestine, leading to decreased serum calcium level which in turn will result in increasing the serum PTH hormone level.

Oral dryness symptoms were relieved after initiation of hormonal replacement therapy along with alendronate and calcium supplements [21]. Oral dryness reduces after the initiation of hormonal replacement therapy resulting in improved quality, clearly suggesting the relation of estrogen with saliva [15]. Similar findings were reported by Volpe et al. who also suggested that with estradiol based treatment there was improvement in oral symptoms in postmenopausal women [22].

Oral dryness leading to multiple hormonal imbalances resulting from estrogen deficiency in postmenopausal women can always be an enigma for oral physician. Thus this can be suggested that burning mouth syndrome and oral dryness could be due to alterations in hormonal levels at menopause time resulting in psychological, neurological, and vasomotor changes.

### **Possible Reason for Oral Changes in Post-Menopausal Women**

Steroids sexual hormones likely play a major role in changing the physiology of the human oral cavity. Majority of studies has suggested that oral changes during menopause are manifestation of the changes in female hormonal levels. Clinically, menopausal women may exhibit no signs and symptoms but the subjective signs of oral discomfort characterized by a decreased saliva secretion, burning sensation and sensation of oral dryness are commonly seen. Although, many hormones are known to regulate the salivary composition and secretion, the mechanism by which estrogens react to the functioning of salivary glands is still unknown. The human gingiva contain receptors for estradiol which has been proved by autoradiography using radioactively labeled estradiol [23] and oral mucosa has tendency to express estrogen receptors (ERs) mRNA [24].

In salivary glands, low levels of ERs have also been detected [25], and salivary gland ductal cells have shown tendency to express

immune-reactivity to anti-estradiol antibodies. However many studies have been contradictory to prove the presence of estrogen-binding activity or ER proteins in oral mucosa [26,27]. The differential expression of various ER subtypes in oral mucosa may be the reason for the conflicting results of ER expression in these studies.

Importantly, the presence of ER in oral tissues has laid down significant clinical importance and possibly suggests that there is a direct role for estrogen in the physiology of oral mucosa and salivary gland functioning. This may be attributed to an imbalance between the various salivary glands, or changes in the mucosal sensory receptors with low level of estrogen in postmenopausal women.

### **Oral Dryness: Does it Correlate with Systemic Changes**

The oral health is related to general health. The changes in jawbone density seems to reflect an overall changes on the skeleton with falling levels of estrogen, since the improvements shown in the density of facial bones of women after initiating the estrogen therapy has correlated well with increased bone mineral density of lumbar spine and femur. The low levels of estrogen hormone in post-menopausal women prevent the absorption and utilization of calcium [28,29]. This seems to be the single most important factor involved in the development of osteoporosis in these women. F Agha et al. in his study revealed that there is significant negative correlation between severity of oral dryness and bone mineral density in postmenopausal women and suggested that oral dryness could be the earlier marker that could lead to decreasing bone mineral density in these patients [28]. As many women visit a dental office more often than a medical office, so the knowledge of dentist about manifestation of osteoporosis could provide an earlier diagnosis.

Estrogen deficiency plays an important role in increasing the bone turnover in early postmenopausal women. It could indirectly leads to secondary hyperparathyroidism in late postmenopausal women. Khosa et al. proved that the rise of estrogen hormone level was returned to normal values in postmenopausal women after they started receiving the long term estrogen therapy [29]. Thus findings stress on the fact that good history, and presence of signs of oral dryness may be considered as a possible warning sign for development for osteoporosis and such patients should be considered at high risk.

### **Patient Care**

Endocrinal changes more or less directly lead to the oral problems of post-menopausal women, although many of these changes may be associated with physiological ageing of the oral tissues. The treatment of the oral dryness patients has limited results as no substantial treatment modality is available for complete cure except for the symptomatic treatment. The oral physician should provide emotional support and should explain the patient fully for the disease, without giving assurance for successful treatment as the patient must understand and accept the condition and must learn to live with it.

Successful management of oral dryness addresses each aspect of the condition. The goals are to relieve symptoms, prevent or correct the sequelae of salivary dysfunction, and treat any underlying disease. Management must be tailored to the specific diagnosis and to the severity of the condition. Although some patients may require only reassurance and periodic symptomatic treatment, others may have significant systemic disease, which necessitates intensive intervention and regular aggressive therapy.

The major treatment modality proposed for these oral changes are the use of hormone replacement therapy (HRT) but the role of HRT has been controversial. However, studies have shown that HRT achieve success improving oral health by inhibiting the inflammation, reducing the periodontitis disease and the subsequent loss of teeth. These changes may be because of estrogen supplementation which inhibits pro-inflammatory cytokines (interleukin-1, or IL-1, tumor necrosis factor- $\alpha$  and IL-6) from mononuclear cells, T-cell mediated inflammation and bone marrow production of leukocytes [30-32]. Thus, postmenopausal women with osteoporosis or osteopenia of the lumbar spine are less likely to suffer tooth loss or need dentures if they are receiving HRT [33,34].

The use of artificial saliva and even saliva substitutes is recommended for initial stages and if problem fails to heal with the use of common methods, it become necessary to use sophisticated devices which also stimulate saliva secretion in patients who may have a diminished salivary flow. The caries must be prevented with the use of fluorides. The low doses administration of fluoride by daily tooth brushing or mouthwash is also helpful in these patients.

Nevertheless, a very important consideration to make in these elderly women is the elimination of bacterial plaque as this can increase the likelihood of odontogenic infections. Therefore, the mechanical control of bacterial plaque is essential and must be complemented where necessary by the use of some pharmacological product. Therefore, the role of preventive dentistry increases with aging in these women and also the detailed case history is must for diagnosing the enigmatic problem of oral dryness. These oral changes must be diagnosed properly so that patients will be able to receive appropriate care and referral for further investigations and treatment.

## Conclusion

It is rightly said that the dental health is fully involved with the total body health. The oral dryness and hormonal impact on it go hand by hand. The oral physician must understand and there is need to consider this phase better with emotional support as these patients are experiencing stressful life. The close communication should exist between oral physician and primary care physician, as oral dryness may indeed represent an early spy of systemic disease like osteoporosis linked to menopause. So it is important to diagnose them at right time and substantial investigations should be done before starting the treatment. Very few marked studies have been done to bring out the care of oral dryness in these patients. However, it must be recommended that more research should be done to evaluate whether oral dryness patients suffer from other diseases and what role estrogen has to play in them. Also, the long term assessments are needed to further compliment the findings of present.

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